RIGHT-ANGLE GRID SYSTEM FOR MAPPING PLANT DISTRIBUTION

ELLEN MARIE KERN

Heermans Scholar, Henry Shaw School of Botany of Washington University

Unless one has a simple, easily executed method for obtaining an exact sample of plant distribution, the problem of mapping large, heavily populated areas is very difficult. At the suggestion of Dr. Lewis F. Thomas, the usual geographic system of right-angle grids was applied to the distribution of *Taraxacum palustre* var. *vulgare*, *T. laevigatum*, and their hybrids in a selected area. This method, as shown below, not only gave an exact record of the numbers and distributions of these plants, but it demonstrated certain phenomena, such as the occurrence of well-defined "neighborhoods" of similar hybrids which had not been apparent from mere inspection. By choosing grids of the appropriate dimensions it should be possible to adapt the method to any particular problem.

The area chosen for mapping was a rectangle, 170 x 30 ft., located on the campus of Washington University, between Rebstock Hall and Forsythe Blvd., which was known from reconnaissance observation to possess quite a dense dandelion population showing evidences of apomixis as well as hybridization. In setting up the grid, wooden pegs were used to indicate the corners and intersections. Strings stretched between them formed the lines, the distance between lines being ten feet. The plants along each line were scored for characters previously selected —leaf shape and seed color—and their positions were recorded. Two hundred and fifty sample leaves fell into five leaf-shape groups, A, B, C, D and E (fig. 1).

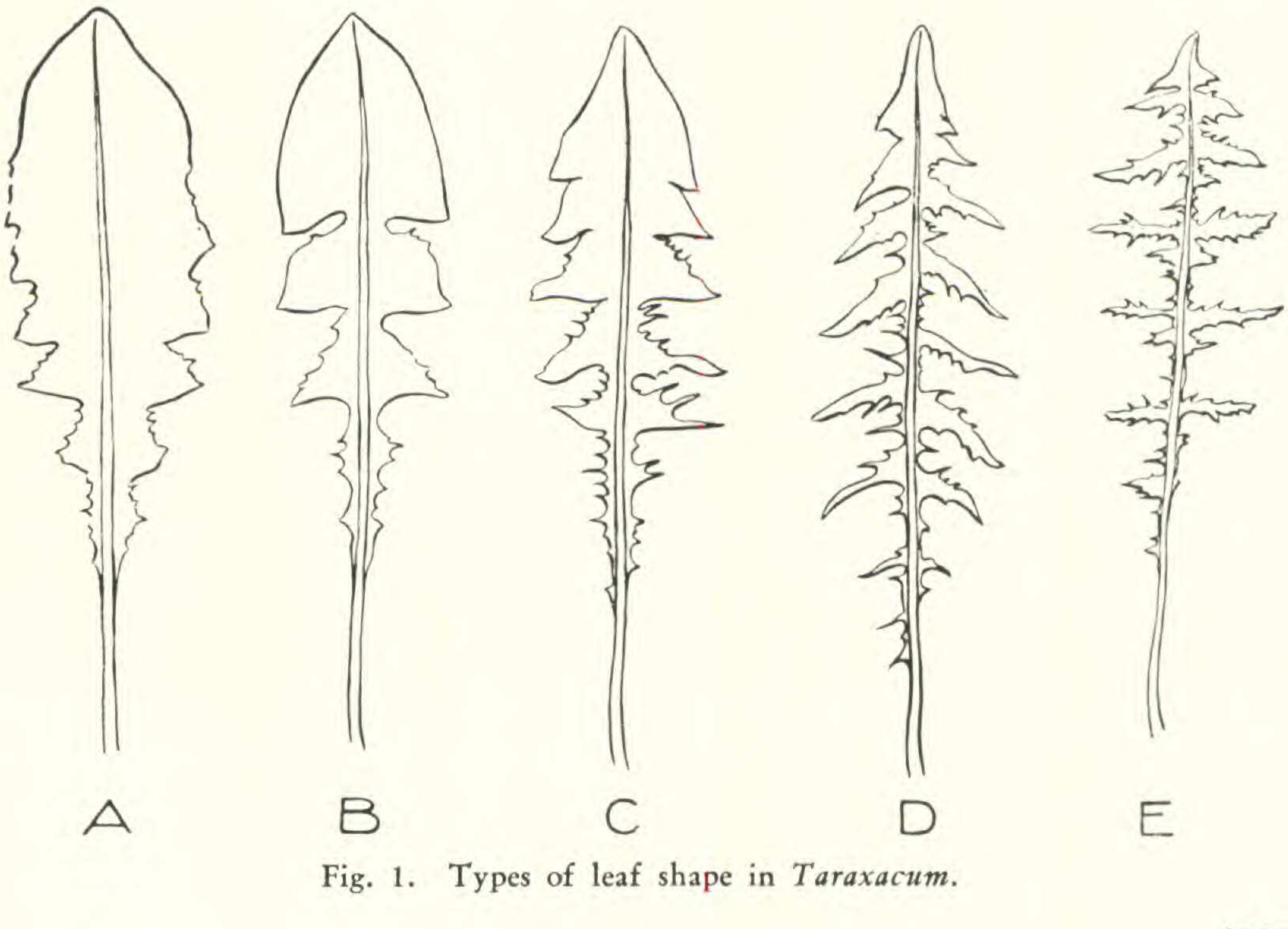

Fig. 1. Types of leaf shape in *Taraxacum*.

The seed types were 1 (gray), 2 (tan), 3 (brown), 4 (pink), and 5 (red). *Taraxacum palustre* var. *vulgare* is characterized by having entire leaves and gray seeds (A-1), while *T. laevigatum* has deeply cut leaves and red seeds (E-5). A map of the grid was drawn to scale. Symbols representing the various features of the dandelions were devised and plotted along each line of the grid (fig. 2 representing a small portion of the map).

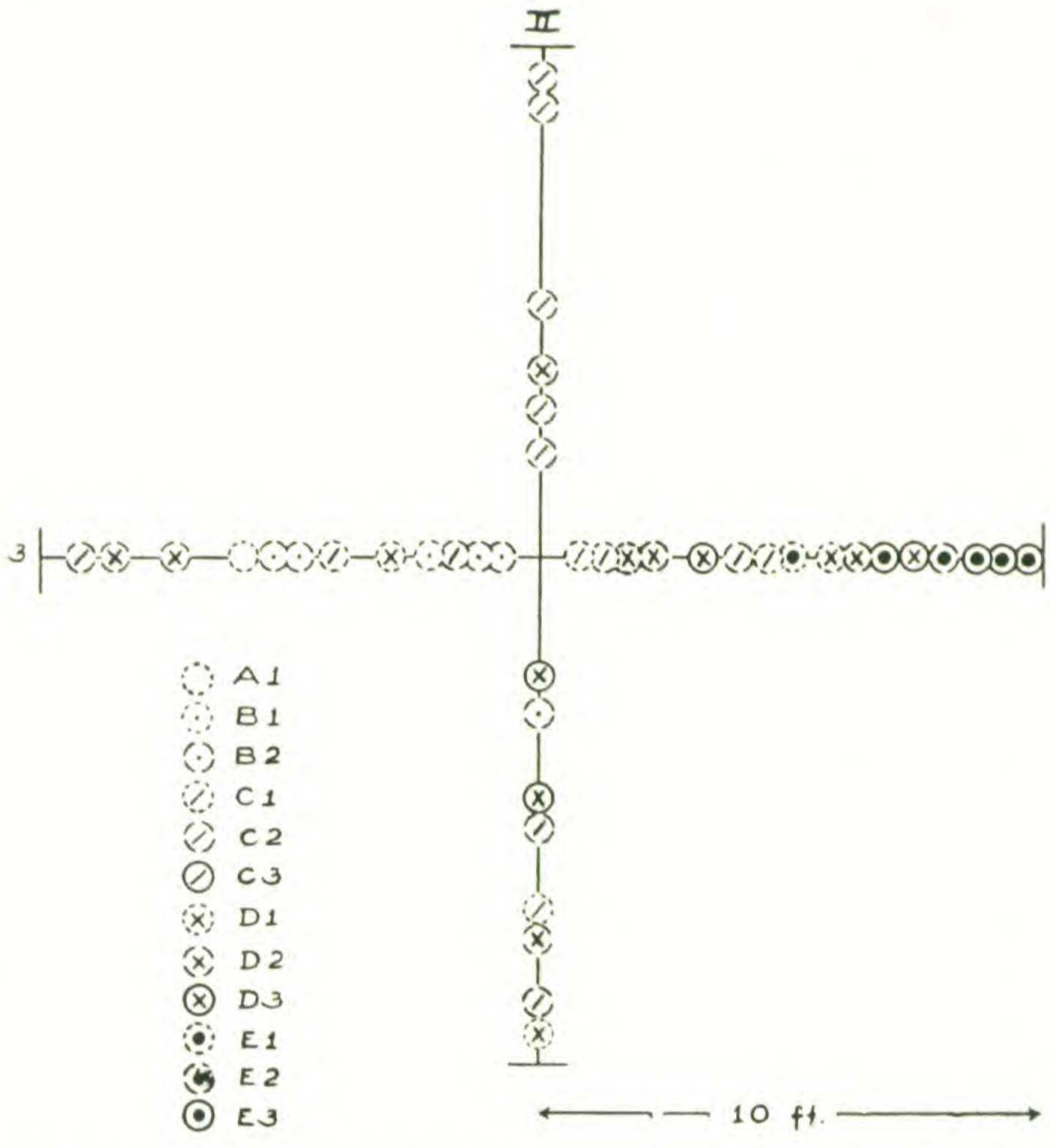

Fig. 2. Individual dandelion plants along Lines II and 3 represented by symbols for leaf shape and seed color.

A simplified map of the total area (fig. 3) indicated certain dandelion "neighborhoods." Plants with dark seeds and deeply cut leaves (similar to *T. laevigatum*) tended to occur in the northern portion of the area; those with gray seeds and entire leaves (similar to *T. palustre* var. *vulgare*) occurred in the southern and eastern part; and the intermediate types with tan seeds and slightly cut leaves were found throughout. The mapping not only made distribution study possible, but also gave data for correlation charts (table I). There is some correlation between leaf shape and seed color, for, although apomixis somewhat clouds the picture, the plants group toward the A-1 (entire leaves, gray seeds) and E-4 (deeply cut, dark) types, rather than the A-4 (entire, dark) and E-1 (deeply cut, gray) types.

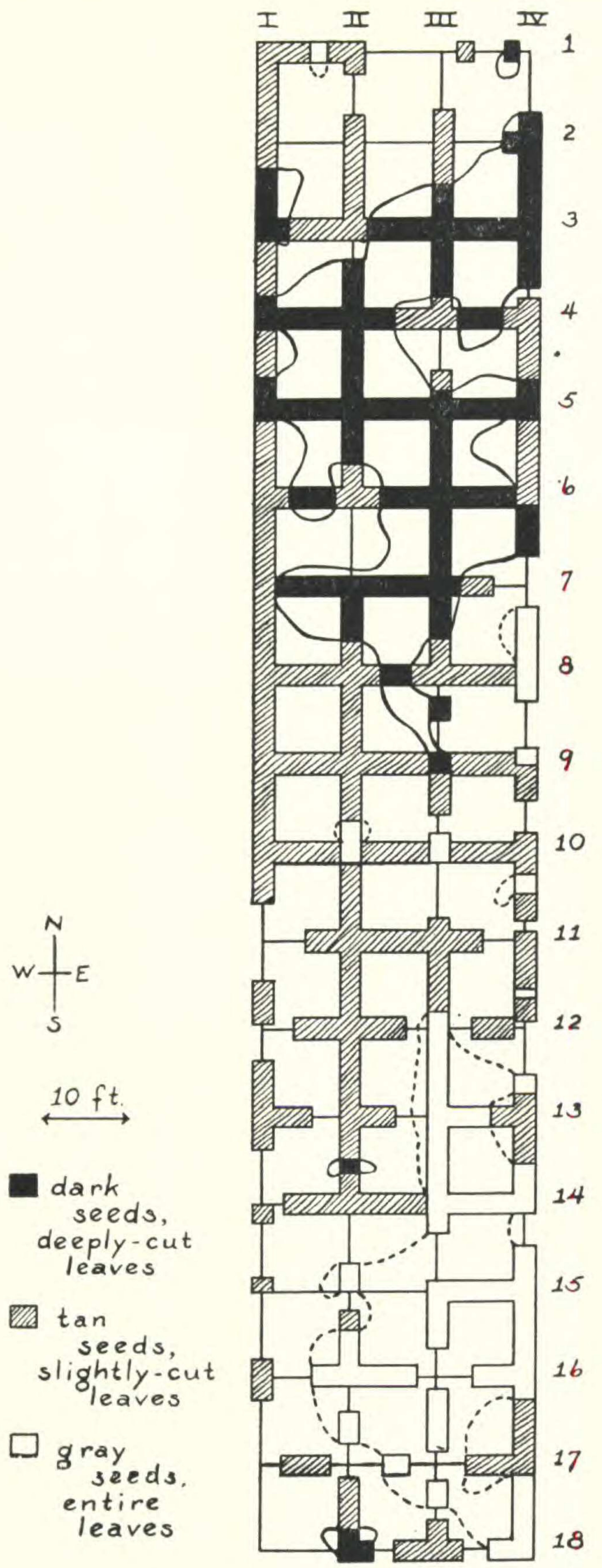

Fig. 3
Grid map of the total area indicating dandelion "neighborhoods."

The right-angle grid technique has the advantage of being adaptable to any type of plant distribution study, merely by increasing or decreasing the distance between lines. For micro-distribution the scale may be brought down to one yard or one foot; for macro-distribution, one mile or ten miles—whatever distance appears suitable. The traverse map, frequently used in plant distribution study, provides just a linear section, whereas the grid supplies the more complete areal view.

TABLE I

CORRELATION OF LEAF SHAPE AND SEED COLOR

Number plants along north-south lines						Number plants along east-west lines					
Seed color	Leaf shape					Seed color	Leaf shape				
	A	B	C	D	E		A	B	C	D	E
1	12	21	12	11	2	1	1	6	8	10	5
2	22	96	64	60	16	2		15	30	25	22
3	9	9	18	18	5	3		1	4	10	12
4			1	1		4					1

In conclusion, I wish to thank Dr. Edgar Anderson for his helpful suggestions, Mr. Richard Holm and Mr. Charles Heiser for their assistance in mapping, and especially Dr. Lewis F. Thomas, who proposed this mapping technique.